



Wildlife research update: February 2007

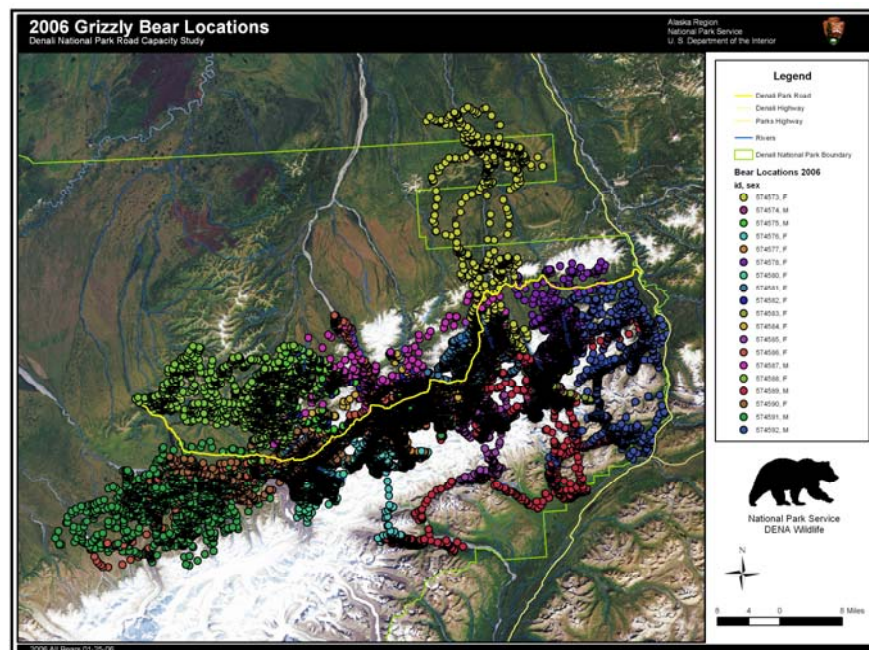


Figure 1. NPS researcher Pat Owen attaches a GPS collar and takes biological samples from an anesthetized grizzly bear as part of the road capacity study. NPS Photo.

In spring of 2006, researchers deployed 20 GPS collars on grizzly bears within the road corridor (Fig. 1). GPS collars were programmed to calculate the position of the bear once every hour and automatically fall off the bears on 20 September 2006. Park staff retrieved 19 of the 20 collars from the field. A total of 45,370 locations were obtained on 16 bears (Fig. 2). Three bears were censored from the analyses because they either did not have any locations within 3 km of the park road or were cubs whose behavior was autocorrelated with the mothers. Mean error of locations from GPS collars at a fixed point was found to be about 9 m.

Figure 2. Locations of GPS collared grizzly bears during summer 2006.

These 16 grizzly bears crossed the park road 466 times between May and September 2006 (Table 1). The



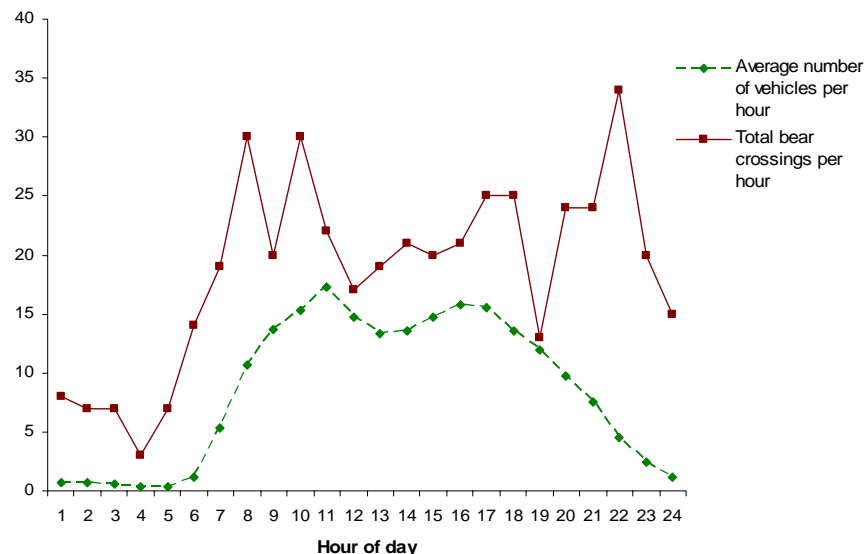
number of crossings varied significantly among bears and ranged from 0 to 144 crossings. Differences among bears were primarily due to the position of a bear's home range relative to the park road. The fewest crossings for all bears occurred in September.

Researchers considered a bear inactive when movement rates were $<11\text{m}/\text{hour}$. The highest probability of being inactive was during early morning hours. The height of inactivity (10%) occurred between 3 and 4 am. On average, bears were inactive about 15% (range 10 - 28%) of the time across the entire season.

Park staff installed traffic counters at intervals along the park road to record vehicle numbers to determine whether variation in the amount of traffic on segments of the park road affected bear behavior. Average daily traffic was 282 vehicles from Savage to mile 28; 222 vehicles from mile 28 to the Teklanika gate; 218 vehicles from the Teklanika gate to Toklat; 189 vehicles from Toklat to Grassy Pass; and 107 vehicles from Grassy to Wonder Lake. While study bears utilized habitats along the entire length of the park road, proximity to various road sections by a bear seemed to depend on home range location and not on the section of road a bear was adjacent to. There was no great variation among bears in distance to road by segment. Researchers then compared the distances of locations of inactive bears from the park road to random points along road segments.

Figure 3. Timing of park road crossings by 16 GPS collared grizzly bears and average daily traffic on the park road by hour during summer 2006.

Researchers
found



significant differences in the distance to the road of resting bear locations relative to random points for only five bears. In four of these cases, bears were resting closer to the road than would be found randomly.

Collared bears crossed the road during all time periods (Fig. 3). The greatest number of crossings occurred between 7 and 10 am and during the 10pm hour. It must be emphasized that the results presented here are preliminary and subject to change with more in-depth analysis.

Researchers will capture 20 Dall sheep and outfit them with GPS collars in March 2007. Like the bear collars, they will collect hourly locations and then automatically fall off the animals in September.

Table 1. Number of times GPS collared grizzly bears crossed the Denali Park road in 2006 by month.

Bear ID	Number of road crossings					Total
	May	Jun	Jul	Aug	Sep	
F573	2	10	16	7	3	38
F576	0	0	0	0	0	0
F577	0	0	0	0	0	0
F578	10	0	0	0	0	10
F580	0	4	0	0	0	4
F581	8	13	8	26	4	59
F582	3	17	7	19	19	65
F584	33	43	17	39	12	144
F585	0	0	0	0	0	0
F586	3	6	4	21	8	42
M587	15	11	2	0	n/a	28
F588	1	0	2	1	0	4
M589	0	0	0	0	0	0
F590	14	20	11	6	11	62

M591	6	4	0	0	0	10
M592	0	0	0	0	0	0
Total	95	128	67	119	57	466
% of total	20.3	27.5	14.4	26.0	12.0	